2.0 SPECIES INFORMATION

LISTING STATUS

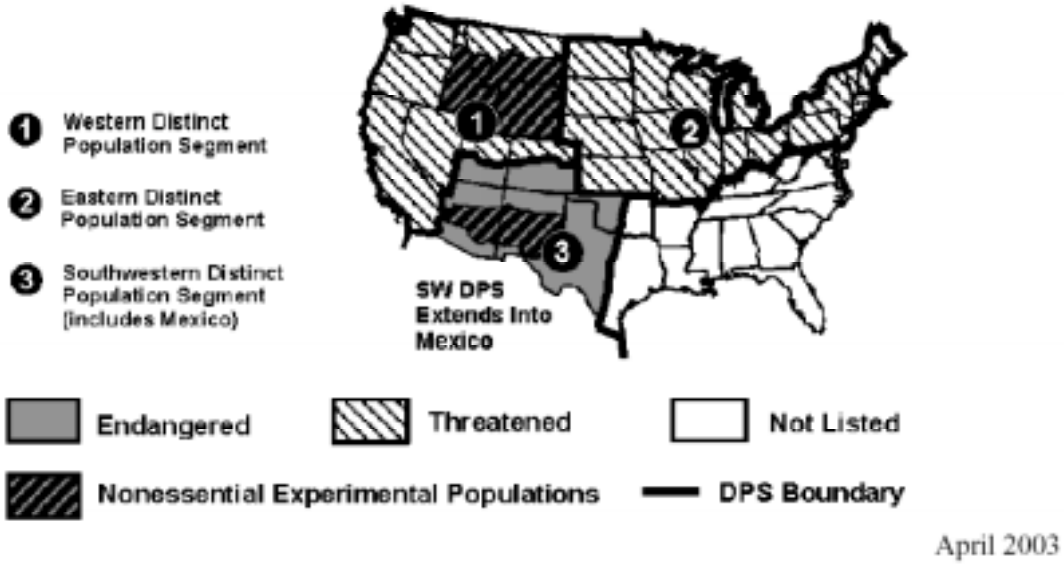
The gray wolf was listed as endangered under the Endangered Species Act (ESA) in 1974 in the conterminous 48 states (16 USCS 1531-1544). The eastern timber wolf subspecies (*C. l. lycaon*) was listed as endangered in Minnesota and Michigan, and the northern Rocky Mountain wolf subspecies (*C. l. irremotus*) was listed as endangered in Montana and Wyoming (USDOI 1974). A third subspecies, the Mexican wolf (*C. l. baileyi*) was listed in 1976. In 1978 the USFWS published a rule that relisted the gray wolf at the species level (*C. lupus*) as endangered throughout the lower 48 states and in Mexico (43 FR 9,607, March 9, 1978). In Minnesota the gray wolf was reclassified as threatened and critical habitat was listed in Isle Royale National Park and portions of Michigan and Minnesota. A wolf recovery team for the Northern Rocky Mountain (NRM) region was appointed in 1974 and a Recovery Plan was approved in 1987 (USFWS 1987).

In 1995 and 1996 USFWS reintroduced 66 wolves from Alberta and British Columbia into the wilderness areas of central Idaho and Yellowstone National Park (YNP) as nonessential, experimental populations (59 FR 60252, November 22, 1994) under Section 10(j) of the ESA (16 USCS 1539(j)) with the goal of reestablishing a sustainable gray wolf population in the northern Rocky Mountains (Wyoming, Idaho and Montana) (Bangs et al. 1998). At the end of 2002 there were 663 wolves including 43 breeding pairs: 284 individuals in the Central Idaho Recovery Area, 271 in the Greater Yellowstone Recovery Area, and 108 in the Northwest Montana Recovery Area (USFWS et al. 2003). 2002 was the third year in which there were 30 or more breeding pairs documented within the recovery area.

USFWS established that the reintroduced wolves in the NRM region would comprise an experimental, non-essential population. At the same time, USFWS established a rule under § 4(d) of the ESA that gives USFWS flexibility in responding to wolf-human conflicts outside of the experimental population areas (68 FR 15804). The 4(d) rule allows landowners and permittees who have Federal grazing allotments to non-injuriously harass wolves without a permit, injuriously harass wolves with a permit, or kill a wolf in the act of attacking livestock or herding or guarding animal (68 FR 15804 at 15,828).

The USFWS has defined a recovered wolf population in the northern Rocky Mountain Recovery Area as one that contains at least 30 breeding pairs of wolves (an adult male and female raising two or more pups-of-the-year until December 31), with an equitable and uniform distribution throughout the three states for three consecutive years (USFWS et al. 2003). The USFWS found that 2002 was the third year in which at least 30 breeding pairs of wolves inhabited the Northern Rocky Mountain Recovery Area and the population of 663 wolves had achieved biological recovery objectives (USFWS et al. 2003). If the wolf population remains at least at current levels and distribution, and state management plans are developed, USFWS may publish its proposal to delist gray wolves in the northwestern United States.

On April 1, 2003, USFWS identified three Distinct Population Segments (DPS) of gray wolves in the lower 48 states (68 FR 15,804-15,878); Eastern DPS, Western DPS, and the Southwestern DPS (**Map 1**). To qualify as a DPS, a group of vertebrates must satisfy criteria of both discreteness and significance (61 FR 4,722, February 7, 1996). USFWS found that each of these segments comprised a group of wolves that was geographically separated from the other groups—they are "discrete" (68 FR 15,804 at 15,819), and each of these groups demonstrate unique evolutionary lineages and that the loss of any one would result in a substantial range gap—they are "significant". USFWS concluded that these three DPS represent separate "reservoirs of diversity" and thus warrant reclassification reflecting this uniqueness.



Map 1. Distinct Population Segments of Gray Wolf in the Lower 48 States (68 FR 15,804 at 15,862, 1 April 2003).

The Western DPS completely encompasses California, Idaho, Montana, Nevada, Oregon, Washington, Wyoming, and Utah north of U.S. Highway 50, and Colorado north of Interstate 70. Wolves that are part of an experimental population are not included in the DPS (68 FR 15,804 at 15,818). When FWS established the non-essential, experimental populations in the NRM area, the rule stated that this status would not be changed until the wolf populations were delisted (USFWS 1994). Thus there are two classifications based on geography in the NRM area: the Western DPS and the non-essential, experimental populations. With downlisting, all of the wolves in the NRM area are managed under almost identical rules, the 4(d) rule applied to the Western DPS and the regulations applying to the experimental population (68 FR 15,804 at 15,832).

The rule reclassifying gray wolves into three DPSs also downlists wolves in the Eastern and Western DPSs from endangered to threatened, except where they were already listed as threatened or as an experimental population. Wolves in the Southwestern DPS retained their endangered status. At the same time USFWS established a rule under § 4(d) of the ESA that applies to wolves listed as threatened in the Western DPS (68 F.R. 15,804, 15,863).

USFWS can propose delisting of a species when it determines that a listed population has recovered and there are reasonable assurances that it will not be threatened again when ESA protections are removed (16 U.S.C. §1533(a)). Before USFWS can delist wolves in the NRM it must be determined that human-caused mortality can be regulated (68 FR 15,804 at 15,828) which requires state management plans for Montana, Idaho, and Wyoming that are consistent with the long-term conservation of wolves in the region (USFWS et al. 2003). USFWS must reevaluate the status of wolves by analyzing their status with reference to the five factors listed in § 4(a)(1) (16 U.S.C. §1533(a)(1)), including the "adequacy of existing regulatory mechanisms."

Wolves are currently listed in Wyoming as predatory animals and may be taken any time of year without limit. However, because of their status under the ESA, wolves are not currently managed pursuant to Wyoming statute and regulations. The gray wolf has been assigned the rank of G4/S2 by the Wyoming

Natural Diversity Database. Wolves in Wyoming are currently managed primarily by the USFWS, National Park Service (NPS), and United States Department of Agriculture Wildlife Services (Bangs et al. 2001).

If the wolf is delisted in the Northern Rocky Mountain Recovery Area, management authority will return to the states in which wolves reside if the states have enacted sufficient regulatory mechanisms as required for delisting (USFWS 1987).

Wyoming published a Final Management Plan (WGFD 2003) in preparation for satisfying the requirements of the Northern Rocky Mountain Recovery Plan for delisting. The Plan established a dual status for gray wolves in Wyoming of "trophy game animal" and "predatory animal" depending on the location of the pack or individual (WGFD 2003). If there are 15 packs in Wyoming (8 packs in YNP, Grand Teton National Park [GTNP] and John D. Rockefeller, Jr. Memorial Parkway, and 7 packs in the rest of Wyoming) then wolves would be trophy game animals within YNP and GTNP, the John D. Rockefeller, Jr. Memorial Parkway, and contiguous wilderness areas (Absaroka-Beartooth, North Absaroka, Washakie, Teton, Jebediah Smith, Winegar Hole, and Gros Ventre). Wolves located outside these areas will be classified as predatory animals (WGFD 2003). However, the delisting petition was rejected by USFWS in January 2004 due to the inadequacy of Wyoming's plan to protect wolves. Wyoming is in discussion and possible litigation with USFWS on this point.

DESCRIPTION

The gray wolf (*Canis lupus*) is the largest of the wild canids. It has a long bushy tail and erect, slightly rounded ears. Its legs are longer, feet larger, and chest narrower than a dog of similar size. The wolf has long, thick, coarse fur that is typically grizzled gray but that can vary from black through white. The most common pelt colors in the northern Rocky Mountains are grizzled gray and black (USFWS 1994). Average height at the shoulders is 65-80 cm; total length (nose to tip of tail) is 1.3 to 1.5m with some individuals approaching 1.8m; and weight ranges from 36-41 kg for females and 41-50 kg for males (Ginsberg and Macdonald 1990).

HABITAT USE

Wolves are habitat generalists and historically occupied most habitats in the Northern Hemisphere including all of Wyoming, and populations flourished in areas with plentiful large prey (Fitzgerald et al. 1994, Long 1965, Mech 1970). The presence of abundant prey, which in Wyoming is elk, and relatively low levels of human activity are the main habitat requirements for wolves.

In the Great Lakes area, the existence of wolf pack territories was negatively correlated with agricultural lands, small-parcel private ownership, road density, and human population density (Mladenoff et al. 1999). A positive relationship was found with coniferous forest cover and county-managed forest lands. The road density threshold of 0.45 km/km^2 best classified pack and nonpack areas (Mladenoff et al. 1995, 1999).

Human activities associated with highways, roads, and other linear corridors cause fragmentation of wolf ranges and result in the death of wolves (Paquet and Carbyn 2003). Persistent occupancy of wolves is usually assured at road densities below 0.6-0.7 km/km^2. Road density is the measurable manifestation of human activity and the mortality of wolves is caused by the humans using the roads, rather than road density *per se*. Roads with low use can provide travel corridors for wolves.

Wolves also appear to avoid snowmobile activity. In Voyageurs National Park in Minnesota, wolf activity was absent during the times that snowmobile incursions occurred (USDI 1996). In areas where wolves occurred at higher road densities, the animals sustained high human-caused mortality and did not survive at levels that would sustain a population (Mech 1989). Such areas can persist as population sinks if there are large adjacent reservoirs of occupied wolf range.

In the Bow River Valley in Alberta, Canada, use of habitat types was related to human use levels and habitat potential (Paquet and Carbyn 2003). Alienation of wolves occurred when more than 10,000 people/month used an area, regardless of habitat quality. Wolf use patterns were altered at lower human use levels as well.

In the Central Rocky Mountains of Canada wolves were affected by topographic complexity and elevation. Wolves converged in broad river valleys in winter, where movement was less restricted by snow and elk converged (Callaghan 2002).

Diet

Wolves are opportunistic predators that feed primarily on ungulates though they will also take beavers and other small mammals (USFWS 1994). In YNP and adjacent areas elk have been the primary ungulate taken (> 85% of documented kills have been elk), followed by bison (2% of kills), deer (2%), moose (< 0.5%), and pronghorn (< 0.5%) (Mech et al. 2001, Ripple et al. 2001, Smith et al. 2000, USFWS et al. 2002). Most elk killed in GYA were calves, adult females, or individuals with low marrow fat and the adults killed were older than the mean age, by sex, within the general elk population (Mech et al. 2001). In Riding Mountain National Park, Canada, elk were the main food base. The kill rate per wolf was one elk per 14 days (Carbyn 1983). The kill success rate varies seasonally. In the Greater Yellowstone Area (GYA) from November 15 to December 15, when elk are in good condition, the kill rate is lower than during the month of March, when elk are in poor condition (Halfpenny 2004).

Wolves will also take livestock. In the western United States, the real and perceived impact of predation on livestock was a major factor in the extirpation of wolves (Young and Goldman 1944). Across the livestock industry losses due to wolf depredation are few; however, individual ranchers can, for a variety of reasons, sustain significant loss (Fritts et al. 1992, Mack et al. 1992). In addition to direct loss, indirect costs may accumulate because of increased management activities, needed changes in husbandry practices, or uncompensated losses. Defenders of Wildlife has, since 1987, made compensation payments of more than $200,000 for wolf depredation of livestock and guard dogs (http://www.defenders.org/wolfcomp.html).

TABLE 2: CONFIRMED WOLF-CAUSED LIVESTOCK LOSSES IN GREATER YELLOWSTONE AREA, FROM 1995 THROUGH NOVEMBER 2002

	1995	1996	1997	1998	1999	2000	2001	2002	Total
Cattle	0	0	5	3	4 (1)	7 (3)	22 (20)	30 (25)	71 (49)
Sheep	0	13	67	7	13	39 (25)	117 (37)	36	292 (62)
Dogs	1	0	0	4	6 (4)	8 (5)	4 (4)	0	23 (13)
Horses	0	0	0	0	1 (1)	0	0	0	1 (1)
Wolves moved	6	8	14	0	0	6	8	?	42
Wolves killed	0	1	6	3	9	6	9	6	34

Values in Parentheses are the Total Number for the Year in Wyoming.
Source: USFWS et al. 2002 and WGFD 2003

Denning Sites

The first wolf den found in recent years in the U.S. consisted of five den openings on a flat, forested knoll adjacent to a meadow. The den openings were hidden in Engelmann spruce, Douglas-fir, and lodgepole pines; the meadow was thought to be used as a rendezvous site (Ream et al. 1989). Dens in northwest Montana and the Canadian Rockies are typically located in valley bottoms and lower slopes, with flat to moderate slopes, on south and east aspects, on depositional landforms, at sites close to trails, far from human habitation and activity, and close to meadows and other openings (Matteson 1992). Dens are frequently used repeatedly and thus den sites represent a significant habitat element for wolves.

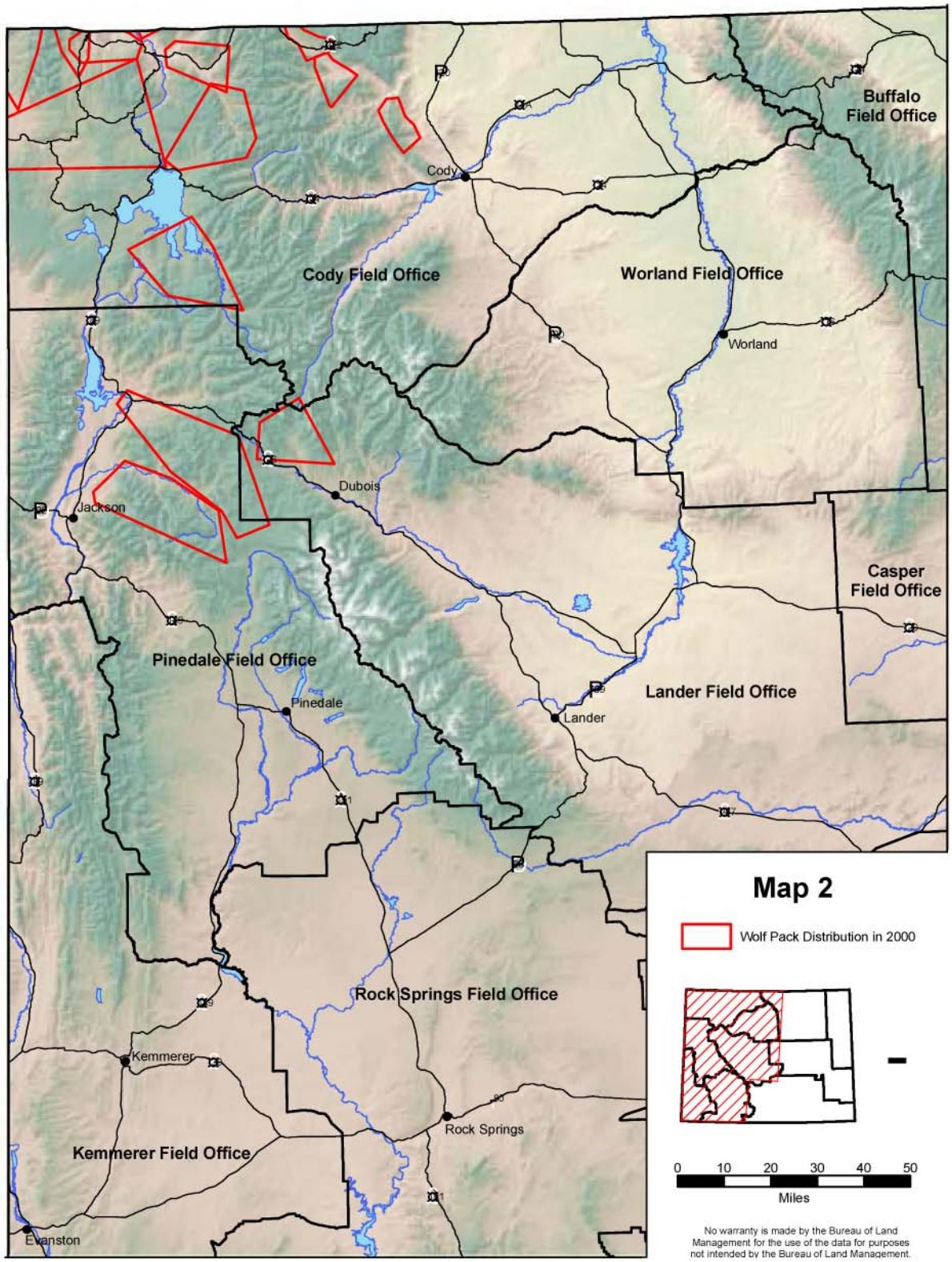
Wolves do not tolerate human activity near dens and pups, although researchers have been able to make observations without disturbing the animals. Disturbance can cause desertion of home sites. Dens within 2.4 km of roads or campgrounds were used by wolves and wolves may be adapting to human activity and disturbances (Mech 1995, Paquet and Carbyn 2003).

DISTRIBUTION

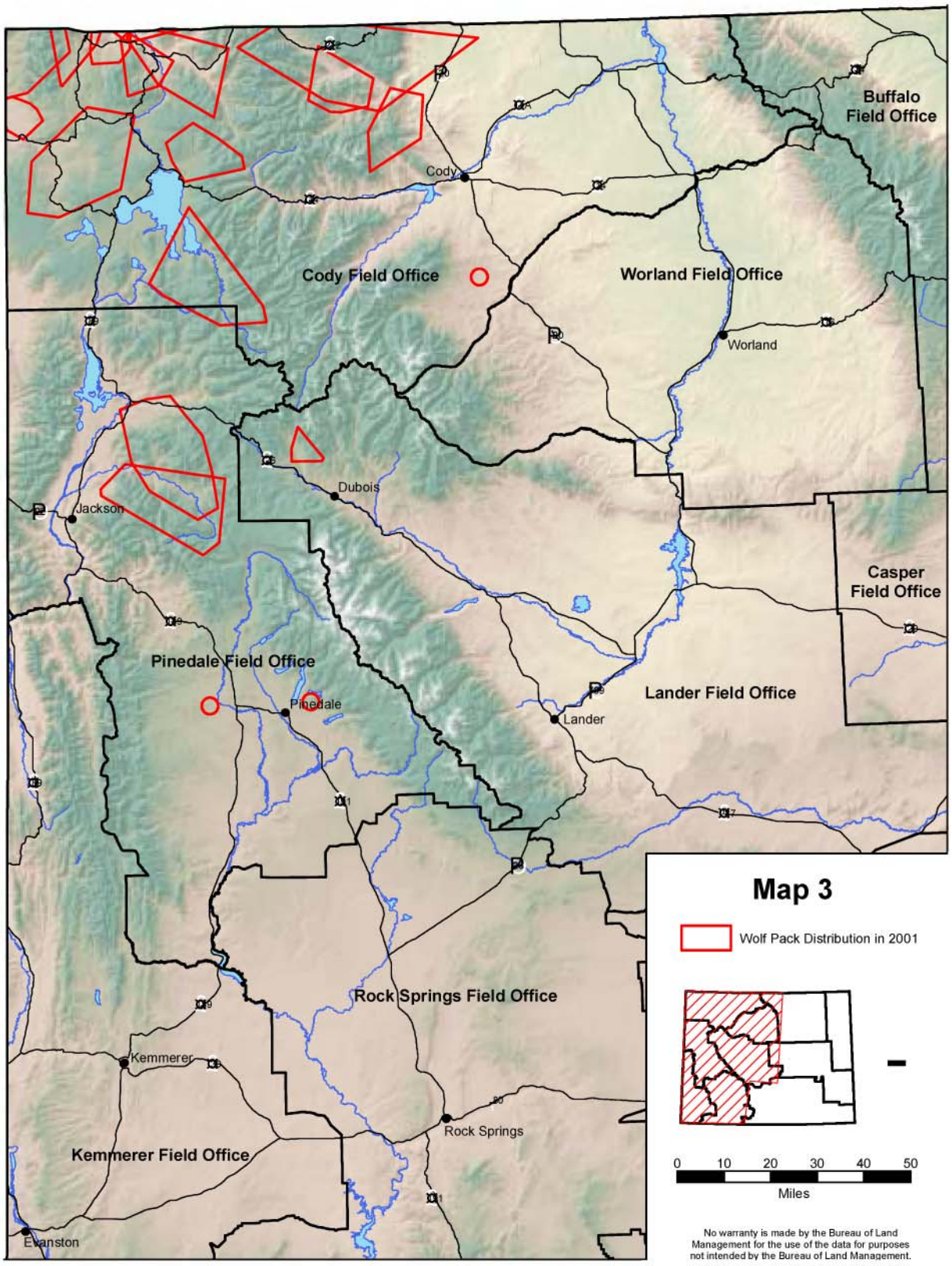
As recently as the mid-nineteenth century gray wolves existed throughout most of North America exclusive of the Gulf Coast region where the red wolf (*Canis rufus*) was found (Nowak 1983, Young and Goldman 1944). Wolves were present throughout the northern Rocky Mountain region prior to colonization by Europeans which resulted in reduction of native ungulate populations, introduction of livestock, and persecution of wolves (Lopez 1978, Young 1944). By the 1940s, wolves persisted only in isolated locations in the United States. In the late 1970s wolves were dispersing into the mountainous areas near Glacier-Waterton Lakes National Parks in Alberta, Canada, just across the border (Ream and Mattson 1982). And then in 1985 a pack of 12 wolves crossed the border from Alberta to Glacier National Park (Robbins 1986). Breeding was documented in 1986, for the first time in 50 years in the U.S. (Ream et al. 1989), and by 1992 at least 50 individuals were known to reside in at least four packs along the continental divide of Montana (Fritts et al. 1995, Pletscher et al. 1997, Ream et al. 1991). Wolves were documented from Idaho since the early 1980s. Prior to reintroduction, lone wolves have ventured into the GYA on a number of occasions (USFWS 1994), and a single wolf was documented in northwestern Wyoming in 1992 (Fritts et al. 1995).

After many years of effort and planning, wolves were reintroduced into the Greater Yellowstone Area (GYA) in 1995-1996 (USFWS 1994). This effort targeted large tracts of federal public lands (Yellowstone National Park (YNP) and the surrounding U.S. Forest Service wilderness areas) that supported large populations of wild ungulates and had a relatively low likelihood for wolf-human conflicts. Today wolves are found in the northwestern portion of Wyoming, largely in the GYA (**Maps 2-6**). There are 14 packs in YNP and 7 that spend most of their time in Wyoming (WGFD 2003). Numerous sightings of wolves suggest that they roam over much of western Wyoming. The known distributional extent of these wandering wolves is the Bighorn Mountains and Ten Sleep to the east, Morgan, Utah (outside Ogden) to the south, and into Idaho to the west (Jimenez 2004). Wolves have been sighted southwest of Meeteetse and around Worland and Thermopolis. Wolves are also routinely seen around Kemmerer and Cokeville, and Lander, and have shown up east of Rock Springs. In these southern portions of the Red Desert, the wild prey density is very low and cattle and sheep density is higher; the wolves switch to the available prey and conflicts result. Although wolves can prey on pronghorn, these ungulates do not constitute consistent dietary items.

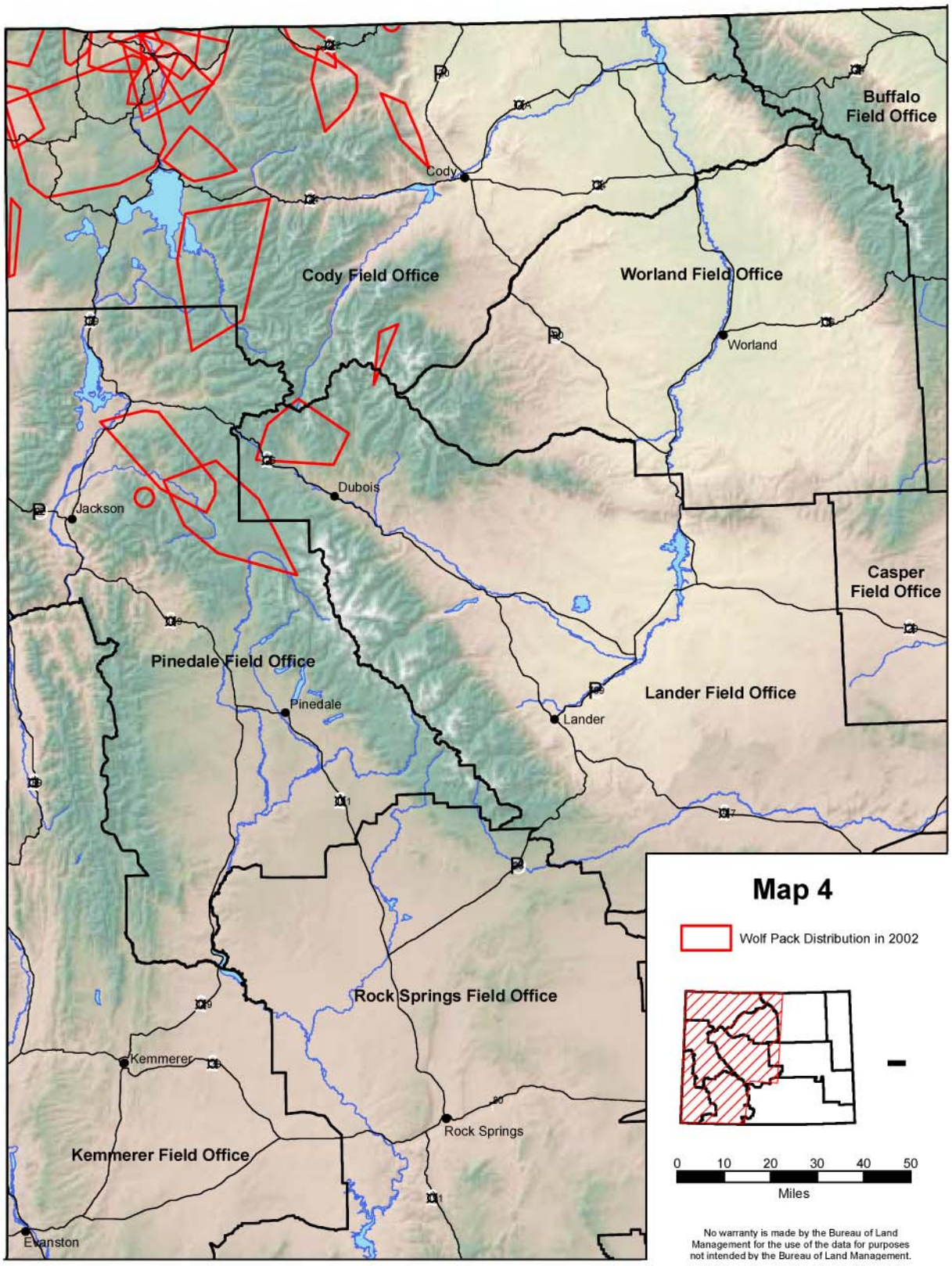
Map 2. Distribution of Wolf Packs in Wyoming in 2000 (USFWS et al. 2001, Figure 3).



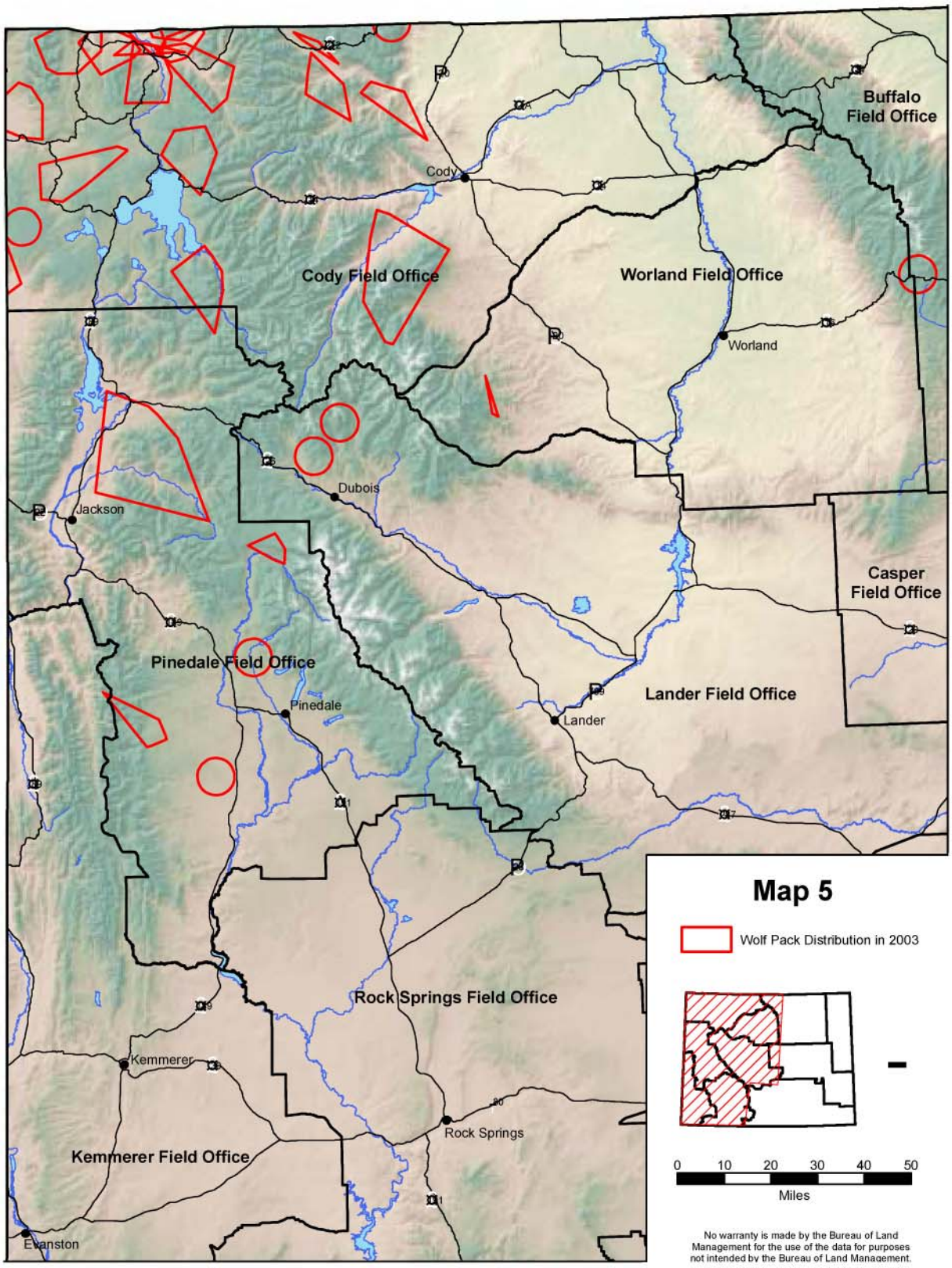
Map 3. Distribution of Wolf Packs in Wyoming in 2001 (USFWS et al. 2002, Figure 3).



Map 4. Distribution of Wolf Packs in Wyoming in 2002 (USFWS et al. 2003, Figure 3).



Map 5. Distribution of Wolf Packs in Wyoming in 2003 (USFWS et al. 2004, Figure 3).



Movement

Wolves expand their range via dispersal, usually settling into unoccupied territories within 50-100 km of their natal pack (Gese and Mech 1991, Wydeven et al. 1995) and these dispersing animals account for 10%-30% of individuals in a wolf population (Gese and Mech 1991). Longer distance dispersals are not unknown. Dispersers in the Central Rocky Mountain recovery area moved up to 800 km (Ballard et al. 1983, Boyd and Pletscher 1999). January-February and May-June were peak dispersal times (Boyd and Pletscher). This mobility of wolves provides for significant genetic exchange across regions, repopulation following wolf reductions (Stephenson et al. 1995), and source animals for recolonization.

Between 1995 and 1999, the Yellowstone Wolf Project documented 36 dispersal events (18 females and 18 males) (Smith et al. 2000) with males dispersing an average of 54 miles and females an average of 40 miles. Dispersals have been documented among and between all three recovery areas in the northern Rockies (Bangs et al. 1998, Mack and Laudon 1998, Smith et al. 2000) and into adjacent states (Washington, Oregon and Utah). Dispersal paths crossed international boundaries, state boundaries, public and private land boundaries, different land uses, and agency jurisdictions (USFWS et al. 2000).

In the central Rockies, colonizing wolves moved over large-scale landscapes rather than defined corridors (Boyd and Pletsher 1999). Consequently, it is not possible to define dispersal habitat. Rather, the appropriate approach would be to eliminate non-used habitat such as areas with high road density and human activity.

THREATS

Human-caused mortality including legal and illegal harvest, depredation control, and vehicle collisions are the largest cause of mortality and is the only source of mortality that can significantly affect wolf populations at recovery levels (USFWS 2000). In the GYA, of 20 documented wolf mortalities in 2000, nine were human-caused (six control actions, two vehicle collisions, and one illegal take), six resulted from natural causes, and five were of unknown cause (USFWS et al. 2001). Researchers have found that if annual mortality exceeds 30-40%, population growth of wolves may be suppressed (Ballard et al. 1987, Fuller 1989, Keith 1983). The response of wolves to humans is variable, as can be expected in a long-lived animal with a large degree of social transmission. Wolves are sensitive to human predation and harassment, which influence the distribution and survival of wolves. However, human-caused mortality is consistently noted as the major problem (Paquet and Carbyn 2003). Loss of habitat is a trend to be expected as human populations increase and more development occurs.

In unexploited populations annual mortality is 45% for yearlings and 10% for adults (USFWS 1994). Intraspecific conflict between neighboring packs, starvation, disease and injury are the primary causes of mortality (Mech et al. 1998). However, natural mortality does not regulate populations in the northern Rockies (USFWS 2000).

Flexible food habits, high annual productivity, and dispersal capabilities enable wolves to respond to natural and human-induced disturbances. These traits confer a high degree of resiliency on wolves (Weaver et al. 1996). Wolf distribution will ultimately be defined by the interaction of wolves' ecological requirements and human tolerance (Paquet et al. 2001), not by artificial delineations that are administratively determined. In short, ungulate abundance and distribution and human settlement patterns will define wolf habitat. The network of public lands in western Montana, central Idaho, and northwest Wyoming facilitates connectivity between the three sub-populations and the public lands in the rest of the Rocky Mountain west will provide dispersal routes. Wolf populations will fluctuate as a result of management actions, natural mortality, legal harvest, illegal take, wolf productivity, and ungulate population fluctuations.

Gray wolves occur in disjunct populations in the conterminous United States, and management goals will be set to maintain this population structure. Computer simulations of disjunct wolf populations indicate that these populations can survive as long as there is at least occasional movement between populations, and human persecution is not excessive and prey is sufficiently abundant (Callaghan 2002, Haight et al. 1998). Furthermore, it is the long-term levels of mortality and immigration that are important, more so than the short-term fluctuations in dispersal and mortality. However, one ultimate factor that will determine whether wolves persist where they have been reintroduced, and where they disperse, is human attitude. This will require a concerted effort on the part of federal and state agencies and of non-governmental groups. Another significant factor is stochastic: fire, weather (drought and/or hard winters), and disease. These unpredictable and often uncontrollable factors can create unforeseen circumstances and results on recovering wolf populations.

The Yellowstone fires of 1988 took out old growth, which caused a decline in the moose population. The hard winter of 1996-1997 caused a decline in the elk populations, as has the current drought. Disease can present a surprising vulnerability. The introduction in the early 1980s of a human-introduced canine parvovirus to the wolves at Isle Royale caused a crash in the wolf population from 50 to 14 animals in a period of two years (Smith et al. 2003). The effect of epizootoics and enzootics on wolf population dynamics is not well documented. Where information is available, an estimated 2–21% of wolf mortality is due to disease. The transmission of disease from domestic dogs, e.g. parvovirus, is a grave conservation concern (Paquet and Carbyn 2003). Rabies is infrequent in wolf populations. Sarcoptic mange is an epizootic of concern, and some researchers suggest that it could be a regulating factor in canid populations. Other arthropod parasites are known but do not cause significant problems. Viral infections of concern are distemper and canine hepatitis.

The economic forces present often drive decisions that affect the status of wolves. Market interest usually run counter to conservation and restoration activities because the former cater to short-term financial gain rather than long-term sustainability of the environment. Wolves and their protection may encourage society to value biological diversity and the tangible and intangible benefits of such a species in our lives (Paquet and Carbyn 2003).